ORNITHOLOGICAL LITERATURE

FUNDAMENTALS OF ORNITHOLOGY. By Josselyn Van Tyne and Andrew J. Berger. John Wiley & Sons, Inc., New York, 1959: 6 × 9¼ in., xii + 624 pp., 252 illus. $11.75.

Josselyn Van Tyne had been disturbed for many years about the lack of a good English-language *Ornithology*. The available texts, although each had certain virtues, were either out of date, too much devoted to applied biology (at the expense of the "science of birds"), too superficial, or, worse yet, full of mistakes. There was not a single volume one could recommend with good conscience to a student without warning him of these shortcomings. This gap in our literature he set out to fill. When Van Tyne resigned as Editor of *The Wilson Bulletin* in 1948 he already had extensive notes, and from then on he worked on the text with that painstaking attention to detail so characteristic of him. Alas, at the time of his death in January, 1957, the manuscript was not even half completed. American ornithology owes a tremendous debt of gratitude to A. J. Berger for putting aside all of his own projects in order to complete the work. Van Tyne could not have made a better choice in his collaborator, for Berger has an interest in and understanding of many diverse branches of ornithology, ranging from anatomy to behavior. The result of the collaboration is a volume of which a pre-publication reviewer has said, "I have little doubt that Van Tyne and Berger will be adopted for practically all college courses in ornithology and will also be a most useful reference for both amateur and professional ornithologists." I fully endorse this evaluation. This is a far superior volume to anything else available in the English language.

Josselyn Van Tyne was always a severe critic and of nothing more critical than of his own efforts. In a critical analysis of "Fundamentals" which the editors of *The Wilson Bulletin* asked me to undertake, I have been trying to live up to the standards set by Van Tyne. I will first give a chapter-by-chapter analysis, to be followed by a more general summary.

Chapter one is an excellent and thoroughly up-to-date treatment of fossil birds. The essential characters of the extinct types are recorded, their ecology and possible relation to modern types are discussed, but it is not mentioned how little paleornithology has added to our knowledge of avian relationships.

Chapter two, devoted to avian anatomy, is a competent presentation of the major anatomical features, thoroughly incorporating the modern literature. It contains a wealth of detail on the anatomical variation found in the various groups of birds. The treatment, on the whole, is static and descriptive and only rarely is an effort made to indicate the meaning of the differences from mammals and reptiles and the functional significance of the differences between the various families and orders of birds. A few more illustrations in this chapter would have been useful, as, for instance, one indicating the circulation of air through lungs and air sacs. There is a helpful survey of the characters generally used in avian classification. The definitions of these characters are widely scattered in the literature, and it is convenient to have them in one place. This is true, even though, as Van Tyne and Berger realized, most of these characters have far less phyletic value than claimed in the literature. Indeed, most of them may be quite valueless as indicators of relationship.

The chapter on plumage and molt is, on the whole, excellent and very informative. I myself have learned quite a few new facts from this chapter. The theorizing is, however, often shaky. The phylogenetic sequence of feather types (page 71) is certainly not generally accepted. Personally, I find very persuasive the arguments of those who, like Portmann, demonstrate that all downy feathers are secondary derivations. The dogmatic

statement of a steady reduction in the number of flight feathers (page 84) is rather questionable. Actually, the high number of secondaries in albatrosses and condors appears as much of an evolutionary advance as the reduction in the primaries among the nine-primaried birds. Having so many secondaries does not make condors and albatrosses particularly primitive. The section on bird pigments is rather poor. The interesting, unanalyzed pigments of parrots, one of which is fluorescent, are not mentioned. The section on structural colors is disorganized. What do erythrism and schizochroism do in this section? The cited explanation for iridescence is obsolete (Schmidt, Dorst).

The chapter on senses and behavior must have been the hardest chapter to write. There are so many conflicting theories and methods of approach that a synthesis would have been difficult; it was not attempted. The part on the sense organs is straightforward, but stresses anatomy too much at the expense of the senses which these organs serve. No clear picture of avian vision or hearing emerges. In the behavior part, I thought that the restricted definition of intelligence was most vulnerable.

The chapter on voice and sound production is perhaps the most original one of the volume. It is written with an evident love for the subject and brings together much scattered and hard-to-get-at information. It will surely stimulate work in this area.

Chapter six on the distribution of birds, by contrast, lacks originality and homogeneity. Zoogeography is a controversial field, and continuity of thought and consistency is lost if one wants to do right by everybody. The result is an uneven treatment. Griscom's obsolete idea that the composition of the Guatemalan birdlife is essentially a matter of glacial and post-glacial migrations is quoted approvingly (page 166), while the effects of the late Pliocene closing of the Panama gap are not mentioned. Some of the most interesting zoogeographic phenomena, such as rapid range expansions and the mixing of the North and South American fauna in Central America, are not adequately treated, while the cyclical irruptions of northern birds are treated in this chapter rather than under migrations.

An adequate treatment of the large and complex subject of bird migration in a single chapter is virtually impossible. The authors have done very well in the available space. In the section on the causes of migration, I would have liked to see a clearer separation of ultimate (selective) and proximate (physiological mechanisms) factors. In the physiology of migration, more stress should have been placed on the differences in the control mechanisms among species. Witness the difference in the control of the annual cycle of the juncos, the Emperor Penguin, and the Australian Mutton-bird. The failure in bringing previously completed chapters up to date has marred this chapter more than any other. Neither Sutter's radar observations nor Sauer's stellar navigation nor Kramer's rebuttal of Matthews' theory of homing are even mentioned. Instead, much space is given to some thoroughly discredited work. Stresemann's unique work on an annual calendar of migration is not mentioned.

Since this chapter cannot possibly give an anywhere near complete account of migration, it would have been useful to recommend a few books on the subject, for additional reading, in addition to the detailed bibliography of specialized literature.

I found chapter eight, on bird flight, rather chaotic. No clear picture of the aerodynamics of flight emerges. Important aspects, such as landing, starting, and dynamic soaring, are hardly mentioned. The emphasis in the chapter is on the equipment rather than on flight.

The chapter on food and feeding habits is informative and original. The choice from the enormous potential literature is well done. There is no excuse, however, for not incorporating into the text Schmidt-Nielsen's recent discovery of the salt glands.

Chapter 10 on breeding behavior is a well-balanced survey of this enormous field. The treatment in some areas is one-sided, such as the neglect of hole-nesting birds (with respect to territory and nest site selection), age at breeding (*Zosterops*, *Coturnix*, *Streptopelia*), size of eggs, special adaptation of tropical birds, etc. In the discussion of the "initiation of the breeding season," the treatment suffers, as in migration, from a failure of separating proximate and ultimate factors. Though numerous facts are presented, they do not lead to any generalizations.

Chapter 11 deals with social relations, a subject usually neglected by ornithologists. It is a useful survey of this subject, even though one could quibble over some of the details of treatment. Sladen's finding that adult penguins continue to recognize their young in the creches should have been mentioned.

Chapter 12 is a good summary of modern taxonomic ideas. Even controversial subjects are presented objectively and with good taste. There are some minor errors. For instance, *Dicrurus hottentottus* (page 363) is not an example of individual but of geographic variation.

Chapter 13 (with 177 pages) is by far the largest chapter of the book. It attempts to give the most important information on every one of the families of birds as recognized by the authors. The essential information on physical characteristics, geographic range, habits, food, and breeding habits are presented in about 20 lines. A single page is devoted to each family. The resulting consistency and ease of reference is bought at a price. Families with 328, 365, 375, and 398 species get no more space than the more than 20 families with a single species each. There is remarkably little consistency as to the recognition of families. Monotypic genera, such as *Leptosoma*, *Cochlearius*, *Oxyruncus*, *Zeledonia*, *Dulus*, *Tersina*, and *Catamblyrhynchus*, are recognized as families (as well as the Cyclarhidae and Vireolaniidae), a procedure which, although definitely defensible, would indicate a standard of fine splitting; and yet *Rupicola* is included in the Cotingidae; the Panuridae, Paradoxornithidae, Chamaeidae, and Cinclosomatidae are combined with the Timaliidae; the Pachycephalidae and Monarchinae are combined with the Muscicapidae; and worst of all, the Carduelidae are lumped with the Ploceidae; the Estrildidae are not even mentioned. All this indicates extreme lumping. Such unequal standards of family recognition must be confusing to the student. The literature references under the families are on the whole well chosen and cover the world literature, although the selection could have been better in a few families (e.g., Strigidae).

The extreme shortness of the accounts forced the authors to ignore some of the most interesting attributes of these families, particularly those concerning biology and physiology. Nothing is said on the metabolism of hummingbirds, torpidity in the Caprimulgidae, variation in parasitic habits in cuckoos, display patterns and parental care in ducks, etc. The technical diagnosis is copied from the standard literature.

Some of the special features of the volume should be pointed out. The bibliography is an extremely good introduction to the modern ornithological literature. The chapter bibliographies total 46 pages, listing about 1,300 titles. In addition, there are six pages dealing with encyclopedic and bibliographic sources, which will facilitate a further access to the literature. To be sure, the student in a small college may find only a fraction of this available to him, but at least he knows that there is more and where he can find it. Much of the literature listed at the conclusion of chapters is not utilized in the preceding text of the chapters.

There is an extensive glossary (28 pages) which could have been shorter, if some rather self-evident terms had been omitted, as, for instance, under *A*: aberrant. acute, anomalous, anterior, aquatic, arboreal, etc. Some of the terms (e.g., biome) are defined

incorrectly. The definition of the arm as the "region between the shoulder and the elbow" is peculiar to anatomists.

The proofreading has been outstandingly good. I have found only a single evident misprint. Some minor errors, e.g., misspellings for *Phonygammus, Stingelin, Bathmocercus, Regenruf, Xenophon, Lavauden*, etc., seem to be rather slips of the pen. It is a pity that the scientific names were not scrutinized by a specialist. Such inconsistencies could have been avoided as *Tchitrea* (295) for *Terpsiphone* (366, 526), *Totanus* (204, 268, 366) for *Tringa* (135), *Capella* (86, 133, 336) for *Gallinago* (112), *Charadrius* (207) for *Pluvialis* (193, 284), *Dissemurus* (304) for *Dicrurus* (505), *Grallina picata* (509) for *G. cyanoleuca* (135), *Graucalus* (504) for *Coracina* (504), *Laiscopus* (527) for *Prunella* (527), and *Gennaeus* (86) for *Lophura* (73, 421). *Muscadivores* (239) is now called *Ducula*, and *Pygoscelis adeliae* (258) is the correct spelling. The index is full and has guided me quickly to all items I was looking for. I find the absence of authors' names in the index no handicap.

Having completed the consideration of all this detail, we can now weigh the virtues and deficiencies of "Fundamentals of Ornithology." It is a volume of great competence and good balance. Containing but few outright errors, it is a volume one can rely on. It is written simply and clearly with a minimum of jargon except for descriptive anatomical terms. There is a consistent endeavor to lead the student from the very beginning to more advanced topics. Styling, typography, and proofreading are excellent. The illustrations are well chosen, and George M. Sutton's black and white drawings of representatives of 168 families of birds greatly add to the attractivenes of the the volume. The world literature is made available to the student to an unusual degree.

I have two major criticisms. One is that the volume attempts to cover too broad an area in a single volume. We know so much about birds, with thousands of workers everywhere writing monographs and research papers, that a truly up-to-date treatment of almost any subject would have to go far beyond what is included in "Fundamentals." This is particularly true for chapter 13 where the treatment is quite sketchy for most families. I wonder whether it would not be better, in a revision, to eliminate the survey of the avian families, publish it separately, and use the 177 pages gained thereby to permit a fuller treatment in the remaining 12 chapters. Van Tyne had planned the volume for the graduate student, but as it is now before us, it would seem to be closer to the undergraduate level, as also remarked by Friedmann in his review in *Science*.

My other criticism concerns the treatment as such. It is very competent, very scholarly, yet it is largely descriptive. The study of birds has to touch on so many intensely exciting things in avian biology, such as flight adaptations, control of the annual cycle, orientation, but these topics are treated in the volume with the same dryness and aloofness as the details of the skeleton. Nor is the student being made aware sufficiently of the numerous interrelations between function, habit, and structure. The biology of the bird almost invariably takes second place to the description of its structure. Little advantage has been taken of controversial subjects to excite the student. Objectivity is priced above all. Its very value as a reference work diminishes its usefulness as an exciting introduction into the life of birds.

A reviewer once said that a book could be looked at in two ways, what it is and what it could have been. It should be evident from my review that I have full praise for "Fundamentals" for what it is. It is by a considerable margin the best English-language college text in ornithology; indeed it is the best Ornithology in any language (excluding the handbooks of Stresemann and Grassé). Yet as a conscientious reviewer, I cannot conceal my feeling that there is still abundant room for improvement.—Ernst Mayr.